

Remarks

Applicant respectfully requests reconsideration of this application as amended.

Claims 1, 24, and 28 have been amended. No claims have been cancelled or added.

Therefore, claims 1-9 and 24-30 are presented for examination.

35 U.S.C. §102(b) Rejection

Claims 1-9, 25, 26 and 28-30 stand rejected under 35 U.S.C. §102(b) as being anticipated by Gelatos et al. (U.S. Patent No. 5,391,517). Applicant submits that the present claims are patentable over Gelatos.

Gelatos discloses a copper metallization structure and process for the formation of electrical interconnections fabricated with pure copper metal. The metallization structure includes an interface layer intermediate to a dielectric layer, and a copper interconnect. The interface layer functions to adhere the copper interconnect to a device substrate and to prevent the diffusion of copper into underlying dielectric layers. A copper layer is deposited to overlie a titanium layer and an annealing step is carried out to form a copper-titanium intermetallic layer. (Gelatos at Abstract.)

Claim 1, as amended, recites:

A process, comprising:
 providing a device substrate having a dielectric layer thereon;
 removing a portion of the dielectric layer to create an opening;
 forming an interface layer within the opening;
 forming a silver layer overlying the interface layer;
 annealing the substrate to form an intermetallic layer between the silver layer and the interface layer, in which the silver layer is in intimate contact with the intermetallic layer; and

forming a protection layer overlying the silver layer which is thick enough to prevent the silver layer from diffusing into other materials.

Applicant submits that Gelatos does not disclose or suggest forming a protection layer overlying a silver layer which is thick enough to prevent the silver layer from diffusing into other materials. The Office Action acknowledges as much when stating “Gelatos...lack[s] a discussion on method wherein: a protection layer overlying the silver layer.” (Office Action at pg. 4.) Therefore, claim 1 is patentable over Gelatos.

Claims 2-9 depend from claim 1 and include additional limitations. Therefore, claims 2-9 are also patentable over Gelatos.

Independent claims 24 and 28 also recite, in part, a protection layer overlying a silver layer which is thick enough to prevent the silver layer from diffusing into other materials. As discussed above, Gelatos does not disclose or suggest such a feature. Therefore, claims 24 and 28 are patentable over Gelatos for the reasons discussed above with respect to claim 1. Claims 25-27 and 29-30 depend from claims 24 and 28, respectively, and include additional limitations. Therefore, claims 25-27 and 29-30 are also patentable over Gelatos.

35 U.S.C. §103(a) Rejection

Claims 24 and 27 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Gelatos et al. (U.S. Patent No. 5,391,517) in view of Kwon et al. (U.S. Patent No. 6,333,260). Applicant submits that the present claims are patentable over Gelatos even in view of Kwon.

Kwon discloses a semiconductor device having an improved metal line structure. The semiconductor device further includes a first dielectric layer formed on the

semiconductor substrate, a metal film pattern formed on the first dielectric layer, an interface protection layer on the metal film pattern, and a second dielectric layer on the interface protection layer. The second dielectric layer contains a reactive material, e.g., fluorine, which is prevented by the interface protection layer from diffusing to the metal film pattern and reacting with the metal in the metal film pattern to form a damage film, e.g., metal fluoride. (Kwon at Abstract.)

Claim 24 recites, in part, forming a protection layer overlying the silver layer which is thick enough to prevent the silver layer from diffusing into other materials. Applicant submits that Kwon does not disclose or suggest such a feature. The Office Action cites the anti-reflection layer 350 of Kwon as disclosing such a feature. (Office Action at pg. 4.) However, the anti-reflection layer of Kwon is used to “suppress reflection from the surface of the metal layer when the metal layer is finely patterned.” (Kwon at col. 7, ll. 12-14.) This is not the same as a protection layer that is thick enough to prevent a silver layer from diffusing into other materials. This protection layer and its functionality are not disclosed or suggested in Kwon.

Furthermore, as discussed above, Gelatos also does not disclose or suggest forming a protection layer overlying the silver layer which is thick enough to prevent the silver layer from diffusing into other materials. Therefore, claim 24 is patentable over both of Gelatos and Kwon, individually or in combination. Claim 27 depends from claim 24 and includes additional limitations. Therefore, claim 27 is also patentable over Gelatos in view of Kwon.

Applicant respectfully submits that the rejections have been overcome and that the claims are in condition for allowance. Accordingly, applicant respectfully requests the rejections be withdrawn and the claims be allowed.

The Examiner is requested to call the undersigned at (303) 740-1980 if there remains any issue with allowance of the case.

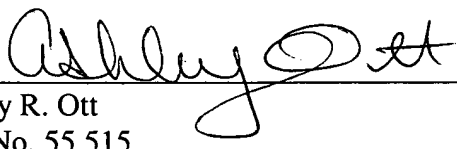
Applicant respectfully petitions for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17(a) for such an extension.

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: June 28, 2005



Ashley R. Ott
Reg. No. 55,515

12400 Wilshire Boulevard
7th Floor
Los Angeles, California 90025-1026
(303) 740-1980